REMARKS

This Amendment and Response to Final Office Action is being submitted in response to the final Office Action mailed November 14, 2005. Claims 1-16, 28 and 29 are pending in the Application.

Claims 1-3, 5, 8-12, 14, 17-19, 21, 24-26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Merli et al. (U.S. Patent No. 6,088,141) in view of Fee et al. (U.S. Patent No. 5,914,794), Lindskog et al. (U.S. Patent No. 6,665,262), and Davis et al. (U.S. Patent No. 6,377,374 B1).

Claims 4, 6, 13, 15, 20, 22, and 28 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Merli et al., Fee et al., Lindskog et al., and Davis et al. as applied to claims 1, 10, 17 and 26, and further in view of Tada et al. (U.S. Patent No. 5,532,862).

Claims 7, 16, 23, and 29 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Merli et al., Fee et al., Lindskog et al., and Davis et al. as applied to claims 1, 10, 17 and 26, and further in view of Cohen et al. (U.S. Patent No. 4,736,359).

In response to these rejections, the Claims have been amended herein, without prejudice or disclaimer to continued examination on the merits. These amendments are fully supported in the Specification, Drawings, and Claims of the Application and no new matter has been added. Based upon the amendments, reconsideration of the Application is respectfully requested, without further search, in view of the following remarks.

<u>Rejection of Claims 1-3, 5, 8-12, 14, 17-19, 21, and 24-26 Under 35 U.S.C. 103(a) – Merli et al., Fee et al., Lindskog et al., and Davis et al.:</u>

Claims 1-3, 5, 8-12, 14, 17-19, 21, and 24-26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Merli et al. (U.S. Patent No. 6,088,141) in view of Fee et al. (U.S. Patent No. 5,914,794), Lindskog et al. (U.S. Patent No. 6,665,262), and Davis et al. (U.S. Patent No. 6,377,374 B1).

Specifically, in regard to Claims 1, 8-10, 17, and 24-26 (which includes all of the independent Claims 1, 10, 17, and 26), Examiner states that Merli et al. teach a system for detecting faults in an optical network, comprising a first node (Figure 1a, 102) and a second node (Figure 1a, 104); and an amplifier node (Figure 1a, 262 or 264) coupled between the first node and the second node, the amplifier node configured to detect a fault on an optical link connecting the amplifier node and the first node and generate a fault report upon detection of the fault (Col. 6, lines 5-20).

In response to this rejection, independent Claim 1 has been amended to recite:

> Claim 1. A system for detecting faults in an optical network, comprising:
>
> a first node and a second node; and
>
> an amplifier node coupled between the first node and the second node, the amplifier node configured to detect a fault on an optical link connecting the amplifier node and the first node and generate a fault report upon detection of the fault, ***the fault report comprising information regarding one of a planned restoration event and the results of an executed restoration event***, the amplifier node is further configured to directly forward the fault report to the second node, the second node configured to detect faults that occur on the optical link connecting the amplifier node to the second node.

This amendment is supported in the Specification in paragraph 51, "The OSC channel permits the nodes to share information on the results of a restoration event. For example,

if node 2 initiates an equipment switch that is unsuccessful in restoring network traffic then node 2 can communicate this information to other nodes as a failed restoration instance message." Similar amendments have been made to the other independent Claims 10, 17, and 26 using the exact same language, "one of a planned restoration event and the results of an executed restoration event."

In addition, it is respectfully submitted that, in all likelihood, where Examiner stated that an amplifier node is disclosed in Merli et al. in Figure 1a, 262 or 264, Examiner meant in Figure 2, elements 260 and 262, as disclosed in Col. 4, lines 20—33, as there are no amplifiers illustrated in Figure 1a, and further that element 264 is not an amplifier, but is rather a first optical breaking switch.

Applicants also assert that Merli et al., in Col. 6, lines 5-20, do no not teach or suggest an amplifier node coupled between the first node and the second node, the amplifier node configured to detect a fault on an optical link connecting the amplifier node and the first node and generate a fault report upon detection of the fault as Examiner states. As noted by Examiner, Merli et al. do not teach or suggest distinguishing separate amplifier nodes for detecting the fault but rather incorporate amplification into each node that detects the fault. Examiner notes that it would have been obvious to one of ordinary skill in the art at the time of the invention that placing the amplification and detection in separate nodes is no different than combining the amplification with the local nodes.

Applicants assert, however, that the functionality of the amplification and detection nodes in the present invention is not necessarily separated. Applicants further assert that what Merli et al. have combined is the amplification, detection, ***and switching*** node functionality all in one node. Claim 1 of the present invention recites that an amplifier node is coupled between the first node and the second node and that ***the amplifier node is configured to detect a fault on an optical link connecting the amplifier node and the first node.*** Thus, the amplifier node is both an amplifier node

and a node that is capable of detecting fault. Applicants assert that what is disclosed in one alternative embodiment of the present invention is the separation of the functionality of the switching nodes and the amplification nodes. Such a separation adds functionality to a fault detection system in an optical network.

As disclosed in paragraph 81 of the present invention, "A switching node is capable of performing, among other things, traffic switching. When a line fault occurs, the switching nodes communicate with one another via exchange of switch requests to ensure that the appropriate traffic switching is performed. ***An amplifier node, on the other hand, does not perform any traffic switching. Instead, an amplifier node, in addition to amplifying the signals traveling between two adjacent switching nodes, monitors the conditions of a line and reports any problems to a downstream switching node to allow the downstream switching node to initiate any appropriate switching actions.***" (Emphasis added) As disclosed in paragraph 82, "From a topology perspective, the switching nodes and the amplifier nodes are two different types of nodes. As far as switching signals is concerned, the switching nodes behave the same way with or without the amplifier nodes, i.e. a switching node can only send a switch request to another switching node to initiate traffic switching. In other words, ***when it comes to traffic switching, the amplifier nodes are transparent to the switching nodes. The transparency allows for easy network upgrades. The amplifier nodes can be added or removed from the network without interfering with overall network topology.***" (Emphasis added) This embodiment of the present invention clearly differs from Merli et al. in which the removal of a node which detects, switches, and amplifies would also remove the switching functionality from that portion of the optical network.

Examiner also states in regard to Merli et al., "Furthermore, the fault monitor (figure 2 #222) communicates with the network management system (116) but does not forward the fault report to the second node."

Applicants assert that despite the fact that Merli et al. state that a purpose of their invention is "that the nodes need no network management for the healing" (Col. 1, lines 66-67) and that the "restoration takes place within the node local control system, without involving network management (Col. 2, lines 4-6), a network management system is involved. For example, "The ***logic control unit 258 communicates with the network management system*** 116 and informs that the node 104 has become a head node." (Col. 6, lines 25-28; emphasis added). Yet another example is that "A process to recover a head node from protection state to working state ***is initiated by the network management system 116,*** which communicates to the local control 258." (Col. 6, lines 29-31, emphasis added). And, yet another example, "The local control unit 258 is connected to a network management means, ***the so called network management system 116***, which is located outside the node 200 (Col. 4, lines 48-51; emphasis added). Thus, the network management system is clearly involved in the fault management system of Merli et al.

On the contrary, the present invention provides that "a local controller in each node makes decisions on whether to activate fault restoration elements within the node, ***eliminating the need for a central computer to coordinate the actions of each node in response to a fault"*** (Paragraph 14; emphasis added). When line faults or node faults occur and that knowledge needs to be routed throughout an optical network, a central computer is not used. Rather, each node receives status information from upstream nodes from an optical supervisory channel (OSC) communicated by the optical span" (Paragraph 50). Thus, once a fault occurs in a Merli et al. network, the local control unit communicates that fault to a network management system, and when a fault occurs in the present invention, status is reported from node to node.

Applicants also assert that Fee et al. fail to make up for this deficiency with Merli et al. Examiner states that Fee et al. teach an optical ring with fault management that communicates with an element manager while the fault information is propagated along the supervisory channels. Examiner further states that it would have been obvious to one

of ordinary skill in the art at the time of the invention to add the Fee et al. fault forward capability to the Merli et al. invention for the benefit of a robust and highly fault tolerant orthogonal ("bridge and latter") detection and reporting system as discussed in Merli et al.

The invention of Fee et al. teaches an element manager that "receives fault and malfunction indications from the line supervisory modules and processes the indications to form messages identifying the faults or malfunctions. The element manager sends the messages to line supervisory modules for transmission on the optical supervisory channel" (Col. 3, lines 1-6).

Applicants assert, however, that this differs from the present invention, in which "***The OSC channel also permits the nodes to communicate messages on planned restoration events to each other***, thereby permitting the nodes to coordinate their actions. For example, node 2 may send a signal announcing to its neighbors that it is about to initiate an equipment switch that will cause a short disruption in traffic through node 2. This information will alert node 1 to not interpret a short disruption in upstream traffic as a line fault. ***Additionally, the OSC channel permits the nodes to share information on the results of a restoration event***" (paragraph 51; emphasis added).

Fee et al. only teach the detection and reporting of existing faults and not information regarding a planned restoration event as does the present invention. Therefore, Fee et al. fail to make up for the deficiencies with Merli et al.

Also, as noted by Examiner, Merli et al. do not teach or suggest directly forwarding the fault to a node for action. Examiner states, however that this deficiency is made up by Lindskog et al. who teach forwarding fault information directly to a fault agent that could take corrective action. Examiner further states that one would have been motivated to forward fault information in a manner such as Lindskog et al. so that

performing distributed fault management functions would provide a more robust fault tolerant infrastructure and that it would have been obvious to one of ordinary skill in the art at the time of the invention to forward fault information in the Merli et al. system as do Lindskog et al. so that a single failure of a faulty node would not disable the fault tolerant mechanism.

Applicants assert that the deficiencies of Merli et al. are not remedied by Lindskog et al. Lindskog et al. specifically teach that an alarm is sent from one node to the next by fault agents (Col. 3, lines 24-26). This alarm is merely a warning that some network component is detected in a faulted state. The alarm is sent to the next node, the receipt upon which the node then analyzes the alarm data (Col. 3, lines 27-32). This differs significantly from the present invention in which the fault report created already comprises information regarding a planned restoration event. Thus, Lindskog et al. do not disclose a fault or alarm with information regarding a planned restoration event, nor does the invention of Lindskog et al. remedy the deficiencies with Merli et al.

Also, as noted by Examiner, Merli et al. do not teach or suggest wherein the fault report comprises information regarding a planned restoration event. Examiner states that Davis et al. teach a method of network restoration where a primary controller sends information regarding a restoration plan to other controllers in the network prior to performing the restoration (Col. 8, lines 25-37; Figure 4B, step 432a). Examiner further states that the motivation to do so is since prior notification of configuration changes supports a hitless restoration scheme where live traffic can be moved or terminated prior to link disconnection.

Applicants assert that the deficiencies of Merli et al. are not remedied by Davis et al. Davis et al. teach the ***sending of a restoration plan message to those nodes whose cooperation in the restoration is required*** to establish a restoration path (Col. 8, lines 29-34). This differs from the present invention in which a planned restoration event

notification is routed as "***each node receives*** status information from upstream nodes from an optical supervisory channel (OSC) communicated by the optical span." (Paragraph 50, emphasis added).

Thus, Davis et al. do not disclose a generated fault report comprising information regarding a planned restoration event or the results of an executed restoration event as does the present invention, nor does the invention of Davis et al. remedy the deficiencies with Merli et al.

Therefore, Applicant submits that the rejection of 1-3, 5, 8-12, 14, 17-19, 21, and 24-26 under 35 U.S.C. 103(a) as being unpatentable over Merli et al. in view of Fee et al., Lindskog et al., and Davis et al. has now been overcome and respectfully requests that this rejection be withdrawn.

Rejection of Claims 4, 6, 13, 15, 20, 22, and 28 Under 35 U.S.C. 103(a) – Merli et al., Fee et al., Lindskog et al., and Davis et al., and Tada et al.:

Claims 4, 6, 13, 15, 20, 22, and 28 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Merli et al., Fee et al., Lindskog et al., and Davis et al. as applied to claims 1, 10, 17 and 26, and further in view of Tada et al. (U.S. Patent No. 5,532,862).

The above arguments apply with equal force here.

Therefore, Applicant submits that the rejection of 4, 6, 13, 15, 20, 22, and 28 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Merli et al., Fee et al., Lindskog et al., and Davis et al. as applied to claims 1, 10, 17 and 26, and further in view of Tada et al. has now been overcome and respectfully requests that this rejection be withdrawn.

Rejection of Claims 7, 16, 23, and 29 Under 35 U.S.C. 103(a) – Merli et al., Fee et al., Lindskog et al., and Davis et al., and Cohen et al.:

Claims 7, 16, 23, and 29 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Merli et al., Fee et al., Lindskog et al., and Davis et al. as applied to claims 1, 10, 17 and 26, and further in view of Cohen et al. (U.S. Patent No. 4,736,359).

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CONCLUSION

Applicants would like to thank Examiner for the attention and consideration accorded the present Application. Should Examiner determine that any further action is necessary to place the Application in condition for allowance, Examiner is encouraged to contact undersigned Counsel at the telephone number, facsimile number, address, or email address provided below. It is not believed that any fees for additional claims, extensions of time, or the like are required beyond those that may otherwise be indicated in the documents accompanying this paper. However, if such additional fees are required, Examiner is encouraged to notify undersigned Counsel at Examiner's earliest convenience.

Respectfully submitted,

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Christopher L. Bernard
Christopher L. Bernard
Registration No.: 48,234
Bradley D. Crose
Registration No.: 56,766
Attorneys for Applicants

DOUGHERTY | CLEMENTS
1901 Roxborough Road, Suite 300
Charlotte, North Carolina 28211 USA
Telephone: 704.366.6642
Facsimile: 704.366.9744
cbernard@worldpatents.com